Remarks

Reconsideration is requested in view of the preceding amendments and the following remarks. Claim 1-38 are in the application.

Information Disclosure Statement

The Information Disclosure Statement submitted on September 27, 2001 has not yet been considered. The Office Action stated that copies of the cited references were not provided. Applicant submits herewith an index of the Image File Wrapper obtained from the USPTO Internet Portal (http://portal.uspto.gov) on March 28, 2006. According to the index, four items of non-patent literature (NPL) totaling 35 pages were received by the USPTO on September 27, 2001. Accordingly, references have been previously supplied, and consideration of these references is requested. For convenience and in order to expedite prosecution, additional copies are submitted herewith.

Claim Objections

Claim 35 stands rejected for using the word "extremizing." Claim 35 is amended to recite "minimizing," and withdrawal of this objection is respectfully requested.

Rejections under 35 U.S.C. § 112

Claims 1-38 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. This rejection is respectfully traversed. According to the Office Action, it "is unclear whether the computer (column 37, line 32) or an outside agency is conducting the processes" of Fig. 1. While Applicants respectfully disagree, it is noted that a rejection for lack of enablement requires that the Examiner show that one skilled in the art would

not be enabled to make and use the invention. MPEP 2100-193. The Office Action makes no such showing but states that one of skill in the art would not know which of several agencies are to conduct the claimed processes. Thus, the Office Action fails to establish lack of enablement. Accordingly, withdrawal of the rejection under 35 U.S.C. § 112, first paragraph is requested. If Applicants have misunderstood the rejection, clarification is requested, and the Examiner is respectfully request to contact the undersigned attorney to expedite prosecution.

Definitions

The Office Action supplies explicit definitions for several expressions, one of which appears in the pending claims. For convenience, Applicant provides suitable definitions of several terms below.

"Mutually exclusive" is interpreted by the Office Action as "dissimilar by deviation and/or magnitude within the context of this genre." No support for this definition is provided, nor is "this genre" identified. A suitable definition for "mutually exclusive" is "of or pertaining to a situation involving two or more events, possibilities, etc., in which the occurrence of one precludes the occurrence of the other." See http://www.infoplease.com/dictionary/.

This definition is consistent with the usage of this expression in the present application. For example, Fig. 3(a) shows a two dimensional NMR data set that is a function a nitrogen-15 coordinate and a proton coordinate and having points A, A' that are associated with a common proton coordinate value. Fig. 3(b) shows a two dimensional NMR data set that is a function of a carbon-13 coordinate and a proton coordinate having points B, B' that are associated with the common proton coordinate value associated with points A, A' of Fig. 3(b). As shown in Table 1, these points can be paired in sets as (A, B), (A, B'), (A', B), or (A', B'). Only one of these sets can correspond to a complete three dimensional NMR data set that is a function of the nitrogen-

15 coordinate, the carbon-13 coordinate, and the proton coordinate. These sets are *mutually exclusive*, i.e., in a full NMR data set (a function of the three coordinates – proton, nitrogen-15, and carbon-13), the point A can be associated with only one of B and B', the point A' can be associated with only one of B and B', the point B can be associated with only one of A and A', and the point B' can be associated with only one of A and A'. One of these four sets must be selected and the remaining three discarded. Indeed, in this particular example, the present application is directed to methods and apparatus for determining the three dimensional NMR data set by selecting one and only one of these mutually exclusive pairs.

"Regression" is defined as "less severe" as taken from dictionary.com. It is unclear what this definition means. Moreover, this word does not appear in any pending claim. However, for convenience, Applicant notes that as used in a cited reference, Dunkel, U.S. Patent 5,572,125 ("Dunkel"), regression appears to refer to "any statistical method where the mean of one or more random variables is predicted conditioned on other (measured) random variables." See http://en.wikipedia.org/wiki/Regression_analysis.

"Heterogeneous signals" are apparently defined as "mutually exclusive." The expression "heterogeneous signal" does not appear in any pending claim. While claims are to be interpreted under a broadest reasonable standard, it is impermissible to interpret prior art references in this manner. Prior art references may be cited only for they teach or disclose. For convenience, Applicant notes that Dunkel describes this expression as follows:

> In instances where the data contain one or more bands made up of many overlapping, unresolved signals, the signal can be referred to as a *heterogeneously broadened signal* made up of a plurality of overlapping homogeneous signals which are not resolved into individual homogeneous signals. Dunkel, col. 9, lines 55-59 (emphasis added).

Thus, according to Dunkel, a "heterogeneous signal" is a sum of a number of other signals.

Rejections under 35 U.S.C. § 102

Claims 1-38 stand rejected as anticipated by Dunkel. This rejection is respectfully traversed. For convenience, the rejection of claim 38 is addressed first.

Amended claim 38 recites:

> A method, comprising:
> obtaining a first multi-dimensional spectroscopic data set and a second multi-dimensional spectroscopic data set, wherein the first and second multi-dimensional spectroscopic data sets each have at least a first coordinate and a second coordinate, wherein the first coordinate of the first data set and the first coordinate of the second data set are common coordinates, and the second coordinate of the first data set and the second coordinate of the second data set are not common coordinates;
> identifying a set of two or more mutually exclusive terms based on the first data set and the second data set, wherein the exclusive terms are associated with combinations of coordinate values of the second coordinates of the first and second data sets and at least one common coordinate value of the common coordinate;
> forming a model of multi-dimensional spectroscopic information, the model having a predetermined dimension greater than that of the first data set and the second data set, wherein the model includes the set of two or more mutually exclusive terms;
> obtaining a third multidimensional spectroscopic data set having the predetermined dimension;
> fitting the model to the third multi-dimensional spectroscopic data set; and
> selecting only one of the set of mutually exclusive terms to represent the multi-dimensional spectroscopic based on the fitting.

Dunkel does not teach or suggest such a method. Dunkel does teach multidimensional spectroscopic data sets and fitting these data sets to models using, for example, regression analysis. However, Dunkel does not teach or suggest forming a "model . . . having a predetermined dimension greater that that of the first data set and the second data set" or "identifying a set of two or more mutually exclusive terms . . . wherein the exclusive terms are associated with combinations of coordinate values of the second coordinates of the first and second data sets and at least one common coordinate value of the common coordinate."

Dunkel does teach conventional curve fitting in which signals (including multidimensional signals) are processed using regression analysis. The Office Action cites Dunkel as teaching first and second multidimensional data sets having a predetermined dimension:

> Multidimensional experimental spectral or imaging data can be automatically analyzed or can be automatically corrected for various data distortions using the invention. In both aspects of the invention, a mathematical model defining the expected experimental spectral or imaging data is selected or determined. The model includes various parameters to be adjusted to best fit the data. Initial estimates of the parameters are made, and such estimates of the parameters are inserted into the mathematical model of the expected spectral or imaging data. Col. 7, lines 35-44.

This portion of Dunkel merely teaches multidimensional data sets, but does not teach or suggest first and second multidimensional data sets having a first common coordinate and second coordinates that are not common as recited in claim 38.

The Office Action cites Dunkel as teaching identifying a set of two or more mutually exclusive terms:

> Such a decomposition model can be used to describe virtually all signals, whether a heterogeneously broadened signal or merely one or more single signals. Such models may be used for determining a wide variety of parameters, such as distortion parameters, scaling parameters, position parameters, and lineshape parameters. Col. 8, lines 25-28.

This portion of Dunkel teaches fitting data as a combination of component signals, but does not teach or suggest identifying mutually exclusive terms associated with combinations of coordinate values of second coordinates of first and second data sets and at least one common coordinate value of the common coordinate as recited in claim 38.

The Office Action cites Dunkel as teaching a multidimensional data set having a predetermined dimension:

> Imaging data is inherently three-dimensional. Spectroscopic data can be even higher-dimensional. For example triple and quadruple NMR resonance

> experiments as used for sequencing proteins lead to four and five dimensional datasets. Compared to the human data analysis, the discussed automation allows to speed up the analysis, improves the reliability of signal detection, increases the complexity of datasets which can be analyzed, provides a quantitative data description, and higher-dimensional datasets pose no conceptual problem to the automated analysis. Col. 33, lines 59-67.

This portion of Dunkel merely repeats the teaching that there are multidimensional data sets, and does not teach or suggest forming a model of multi-dimensional spectroscopic information, the model having a predetermined dimension greater than that of the first data set and the second data set as recited in claim 38.

Because Dunkel fails to teach the features and combinations of features recited in claim 38, claim 38 is properly allowable.

Claims 1-37 recite additional features and combinations of features that are not taught or suggested by Dunkel. For example, claim 1 recites a method of forming a model of multi-dimensional spectroscopic information that includes

> forming a model of multi-dimensional spectroscopic information including at least one set of two or more mutually exclusive terms, the set of terms formed from at least first and second multi-dimensional spectroscopic data sets of a dimension less than the modeled multi-dimensional information.

Dunkel does not teach or suggest forming a model of multi-dimensional spectroscopic information in which mutually exclusive terms are formed from multi-dimensional spectroscopic data sets of a dimension less than the modeled multi-dimensional information. For at least this reason, claim 1 and dependent claims 2-10 and 35-36 are properly allowable.

Claim 11 recites a method that comprises, in part,

> forming a model of multi-dimensional information of a dimension higher than the dimension of the first or second data sets, the model including at least one set of terms where each term in the set represents a potential correlation between features of the first and second data sets.

Dunkel does not teach or suggest forming a model having a dimension higher than that of the data. Accordingly, claim 11 and dependent claims 12-17 and 37 are properly allowable.

Claim 18 recites a device comprising a computer readable media containing programming instructions for a multidimensional interrogation device. The instructions are operable to cause the multidimensional interrogation device to:

> form a model of multi-dimensional interrogation information including at least one set of terms where each term represents a potential correlation between features of at least first and second multi-dimensional data sets, the first and second data sets of a dimension less than the modeled information, and determine which term represents the actual correlation between features of the first and second data sets by comparing the model to a third multi-dimensional data set.

Dunkel does not teach or suggest a model based on potential correlations between first and second data sets of dimension less than that of the dimensions of the model. Thus, claims 18- 23 are allowable.

Amended claim 24 recites a method that includes determining which term of a set of terms represents an actual correlation between features of multi-dimensional data sets by comparing the model to a third multi-dimensional spectroscopic data set having a dimension greater than that of the first and second data sets. As noted above with respect to claim 18, Dunkel does not teach or suggest such a method, and claim 24 and dependent claims 25-29 are properly allowable.

Claim 30 recites an apparatus comprising:

> a device carrying logic to: form a model of multi-dimensional information wherein the model includes at least one set of terms where each term represents a potential correlation between features in at least first and second multi-dimensional data sets of a dimension less than the modeled information, select one of the set of terms for representing the multi-dimensional information by comparing the model to a third multi-dimensional data set.

As noted above, Dunkel does not teach or suggest a model based on potential correlations between features in data sets have dimensions less than that of the model. For at least this reason, claims 30-32 are allowable.

Claim 33 is directed to a method for determining multi-dimensional information concerning an object. The method comprises,

> forming first and second multi-dimensional data sets representing projections of information concerning an object of a dimension one higher than the first and second data sets; correlating the first and second data sets to form a model of the multidimensional information concerning the object, the model including at least one set of terms where each term in the set represents a potential correlation between features in the first and second data sets; determining which of the terms represents the actual correlation of features in the first and second data sets by comparing the model to a third multi-dimensional data set representing information concerning the object.

Dunkel does not teach or suggest forming a model of multidimensional information, wherein the model has a dimension higher than that of the first and second data sets. The Office Action cites Dunkel at col. 8, lines 52-56 as teaching this feature. Applicant respectfully disagrees. The cited portion of Dunkel describes estimating parameters for each of a plurality of signals in a single set of data. Dunkel does not teach or suggest forming a model having a dimension higher than that of the data.

In the Office Action's Response to Arguments at page 16, it is stated that Dunkel teaches higher dimensional data sets such as three-dimensional data sets. However, claim 33 recites forming a model having a dimension higher that that of the data. The cited portion of Dunkel does not teach or suggest forming a model as claimed.

The Office Action further cites Dunkel, col. 7, line 66 to col. 8, line 30. This portion of Dunkel is directing to correcting and fitting data sets. The Office Action emphasizes that "two or more substantially homogeneous signals which overlap and display distinct maxima for each of the overlapping signals, an overlap model can be used to analyze such signals to take into

account the overlap of the component signals." Office Action at page 15. This portion of Dunkel pertains to fitting data and is silent concerning forming a model having a dimension higher than of the data.

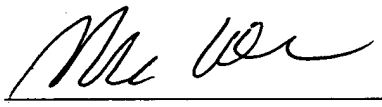
For at least these reasons, claims 33-34 are properly allowable.

Conclusion

In view of the preceding, all claims are in condition for allowance. A telephonic interview would expedite prosecution, and a formal interview request (PTO Form PTOL-413A) is submitted with this Amendment. The Examiner is requested to telephone the undersigned prior to the issuance of the next Office Action to schedule an interview at a convenient date and time.

Respectfully submitted,

KLARQUIST SPARKMAN, LLP

By 

Michael D. Jones
Registration No. 41,879

One World Trade Center, Suite 1600
121 S.W. Salmon Street
Portland, Oregon 97204
Telephone: (503) 595-5300
Facsimile: (503) 228-9446